Available online at www.sciencedirect.com

ScienceDirect

Procedia Economics and Finance 16 (2014) 356 – 367

Procedia Economics and Finance

www.elsevier.com/locate/procedia

21st International Economic Conference 2014, IECS 2014, 16-17 May 2014, Sibiu, Romania

The Analysis of the Factors Which Influence the Change of The Breakeven Point

Dimi Ofileanu[a,*], Sorina Simona Bumbescu[a]

[a]*1 Decembrie 1918 University, Alba Iulia, Romania*

Abstract

The knowledge of the breakeven point allows the assessment of the impact on the exploatation profit any change of the volume of the activity, the price of the product the fix costs or of the variabil unit cost. This issue follows the emphasis on the breakeven point and the way of analizing the factors which influences it.The issue presents the breakeven point of the product and starting from an analysing model based on the physical volume of the activity there are 3 models which analyses the changes of the breakeven point through the value volume of the usage for the productive power and for the critical period.

Selection and/or peer-review under responsibility of Scientific Committe of IECS 2014

Keywords: breakeven point, profitability, influence factors, model of analysis

1. Introduction

Duet to the present economic circumstances (the tendency for increasing of the supply compared with the demand), taking into account the greater power of the buyers and their ability to establish the price of the products, every entity focuses its efforts on costs lowering, lower prices and manufacturing the quantity of products tailored with the market absortion possibilities.

The goal of every entity is the profit maximization, and the application of this implies the analysis of the factors which influences the result of the entity: the sold quantities, the unit cost and the selling price. Every factor is influenced by the socio-economic environment in wich the entity functions and every factor influences the result of the entity's activity. The fulfilment of this goal starts from the premises of knowing the selling volume for which the income covers the whole expeditures; the minimum point of the fulfilment of this condition it is called breakeven

* Corresponding author.
E-mail address: dimi_ofileanu@yahoo.com (Dimi Ofileanu), sorina.bumbescu@yahoo.com (S. Bumbescu)

Selection and/or peer-review under responsibility of Scientific Committe of IECS 2014
doi:10.1016/S2212-5671(14)00814-4

point, the equilibrium point, or dead point, and knowing this point allows analysing the level of the profit on the verge of the changes in the activity volume, the selling price, the unit cost and the fix costs of a product.

The entities are interested by the breakeven point, because they give information on the minimum quantity of products which should be sold in order not to register losts or in order to register a specific level of the profit. The breakeven point is used in analysis of the type "What happens if…?", in order to answer at the questions such as:

- How much can the selling volume lower so that the entity not to enter the lost zone?
- How much can the price be lowered so that the entity not to enter the lost zone?
- How much can the change able unit cost be increased so that the entity not to enter in the lost zone?
- How much can the unit costs be increased so that the entity not the enter the lost zone?

The posibilities of knowing the answers for these questions make the entity to be able to react at the necessary information connected to the conditions which influences the profitability of those factors.

Starting from a model analysis of the changing of the breakeven point suggested by Păvăloaie and company (2010), thre are other models which analysis the breakeven point through the other important factors.

The analysis of the breakeven point can be extended at the entities which manufacture many products, following the same principle, being more complex both as a process and as a computing procedure.

2. Review of the specialized literature

In the economic-financial analysis, the breakeven point has determined constant concern in determining the role of the breakeven in analysing the entity's profitability.

The classical approach of the breakeven point ist hat which the expenditure and the earnings develop liniarly and the breakeven is determined by the erossing lines; any outrunning of the volume of the activity is a profit, so that any lowering of this point is a lost. This approach ist o be found in almost all specialized works (Buşe, 2005; Vâlceanu, Robu and Georgescu, 2005; Burja, 2008; Petcu, 2009), being simple and understandable.

Another approach of the breakeven point ist hat of the hypotesis of unliniarity of the earnings and expenditures, this type of approach being more exacting and laborious. The basis of this approach were layd by R. K. Jaedicke and A. A. Robichek (1964), respectively T.A. Morrison and E. Kaczka (1969), the result being more exact and their obtaining more time consuming.

The relevance of the breakeven point is unanimously recognize in determining the starting point of the profitability of the entity, the discussions taking place in measuring the performance of the entity. I. Stancu (2006) suggested a financial breakeven model based on the updated net value indicator (VAN) as a minimal performance which should be accomplished in order to preserve the shareholders richness.

The usage of the breakeven point was extended in order to reflect the economic risk of the entity, through evaluating the exploiting risk computing the indexes which should indicate the volume of the activity till the breakeven point, as an assurance margin (as an absolute value) or as an assurance coefficient (as a relativ form). Statistics surveys, the assurance margin was used to clasify the entities regarding their exploiting risc (Mihai, 1999) as follows: insecure, slightly stable or comfortable; so the entity can use these data for comparing the obtained information on time.

The breakeven point can be calculated at the level of the product or at the level of the entity (Păvăloaie and company, 2010). The breakeven point on the product level is calculated on the quality level of the product, and the breakeven point at the entity level is calculated at the turnover level.

The breakeven point means many more points of view, each of them with their own advantages the easiest and the most understandable approach is the breakeven point of the product.

3. The analysis of the breakeven point of the product

The breakeven point is the point where the profits sum (V) is equal to the cost sum (CT). For the breakeven point we have:

$$V = CT \quad (1)$$

Taking into account the way of obtaining the profits and the costs we have:

$$V = q_{cr.} * p \quad (2)$$

$$CT=CF+CV=CF+q\_(cr.)*c\_v \quad (3)$$

$$q\_(cr.)*p=CF+q\_(cr.)*c\_v \quad (4)$$

$$q\_(cr.)=CF/(p-c\_v\ ) \quad (5)$$

where:
V – profits obtained through products selling;
CT – total costs;
CF – fix costs;
CV – variable total costs;
q_(cr.) – the production's volume at breakeven point;
p – the selling price unit;
c_v – the variable cost unit.

When the total gross profit margin [q*(p-c_v)] is egual to the fix costs (CF), the breakeven point is reached. Graphically speaking this situation is presented in figure 1.

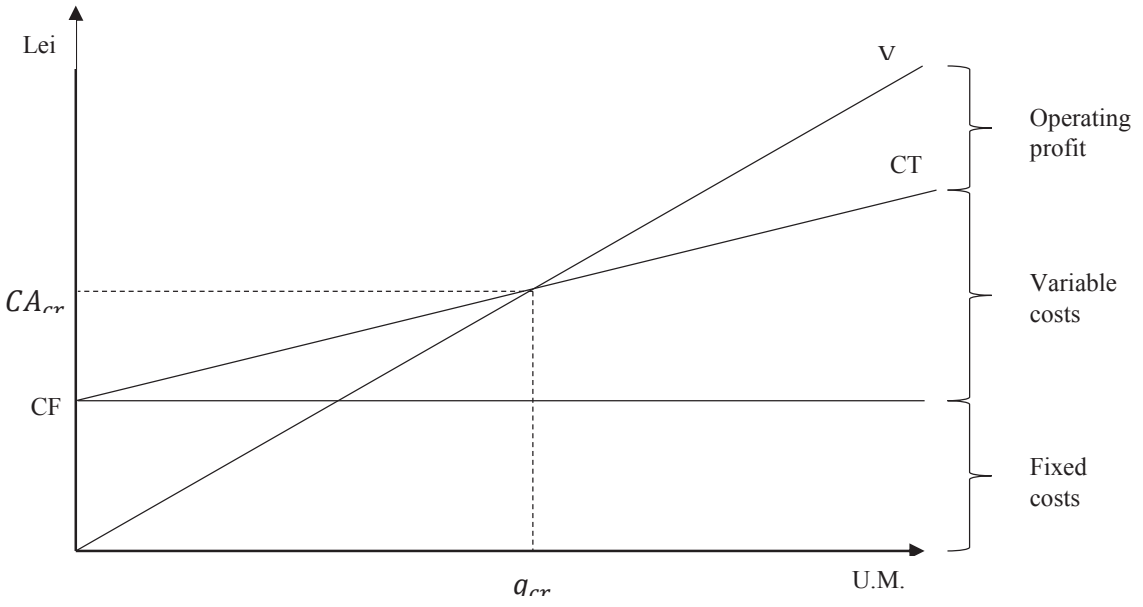

Figure 1. The breakeven point of the product

As it is graphically shown, the change of the breakeven point on the right means that the entity should sell a greater amount of products in order not to enter the loosing zone (q>q_(cr.)), and this is an unfavourable change. The change of the breakeven point on the left means that the entity should sell a lesser amount of products in order not to enter the lossing zone (q<q_(cr.)), which means a favourable change.

A. The change of the breakeven point through the physical volume of the activity
The total change of the breakeven point is calculated as follows (Păvăloaie and company, 2010):

$$\Delta_q = q_{cr.1} - q_{cr.0} = \frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_0 - c_{v_0}} \quad \text{(u.m.)} \tag{6}$$

and it is duet o the following factors:

– change of prices:

$$\Delta_{p_q} = \frac{CF_0}{p_1 - c_{v_0}} - \frac{CF_0}{p_0 - c_{v_0}} \quad \text{(u.m.)} \tag{7}$$

– change of the variable cost per unit:

$$\Delta_{c_{v_q}} = \frac{CF_0}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_0}} \quad \text{(u.m.)} \tag{8}$$

– change of the fixed costs:

$$\Delta_{CF_q} = \frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_1}} \quad \text{(u.m.)} \tag{9}$$

The breakeven point allows other indicators to be calculated such as (Vâlceanu and company, 2005):

– the turnover critical:

$$CA_{cr.} = q_{cr.} * p \quad \text{(lei)} \tag{10}$$

– the usage degree of the productive capacity:

$$G_{cr.} = \frac{q_{cr.}}{q_{max.}} * 100 \quad (\%) \tag{11}$$

where $q_{max.}$ – it is the maximum productive capacity.

– the critical period:

$$t_{cr.} = \frac{CA_{cr.}}{CA} * T \quad \text{(days)} \tag{12}$$

where T – is the period where the breakeven poin is calculated.

B. The change of the breakeven point through the value volume of the activity
Starting from the model presented from Păvăloaie et company (2010) for the analysis of the changes of the breakeven point and from the premises that these changes are easier to understand if they are expressed in monetary units, unless they are expressed in measurement units, we suggest the following analysis of the change of the breakeven point through the turnover critical:

$$\Delta_{CA} = CA_{cr.1} - CA_{cr.0} = \frac{p_1 * CF_1}{p_1 - c_{v_1}} - \frac{p_0 * CF_0}{p_0 - c_{v_0}} \quad \text{(lei)} \tag{13}$$

We re-write the relation and we have:

$$\Delta_{CA} = \frac{p_1 * CF_1}{p_1 - c_{v_1}} - \frac{p_0 * CF_0}{p_0 - c_{v_0}} + \frac{p_1 * CF_0}{p_1 - c_{v_0}} - \frac{p_1 * CF_0}{p_1 - c_{v_0}} + \frac{p_1 * CF_0}{p_1 - c_{v_1}} - \frac{p_1 * CF_0}{p_1 - c_{v_1}} \quad (14)$$

We re-arrange the terms and the relation becomes:

$$\Delta_{CA} = \left(\frac{p_1 * CF_0}{p_1 - c_{v_0}} - \frac{p_0 * CF_0}{p_0 - c_{v_0}}\right) + \left(\frac{p_1 * CF_0}{p_1 - c_{v_1}} - \frac{p_1 * CF_0}{p_1 - c_{v_0}}\right) + \left(\frac{p_1 * CF_1}{p_1 - c_{v_1}} - \frac{p_1 * CF_0}{p_1 - c_{v_1}}\right) \quad (15)$$

So the total change of the breakeven point expressed in monetary units is due to:

change of prices:

$$\Delta_{p_{CA}} = \frac{p_1 * CF_0}{p_1 - c_{v_0}} - \frac{p_0 * CF_0}{p_0 - c_{v_0}} \quad \text{(lei)} \quad (16)$$

change of the variable cost per unit:

$$\Delta_{c_{v_{CA}}} = \frac{p_1 * CF_0}{p_1 - c_{v_1}} - \frac{p_1 * CF_0}{p_1 - c_{v_0}} \quad \text{(lei)} \quad (17)$$

change of the fixed costs:

$$\Delta_{CF_{CA}} = \frac{p_1 * CF_1}{p_1 - c_{v_1}} - \frac{p_1 * CF_0}{p_1 - c_{v_1}} \quad \text{(lei)} \quad (18)$$

C. The change of the breakeven point through the usage degree of the productive capacity

Using the same mechanism we can fiind aut the change of the breakeven point through the usage degree of the productive capacity and the influenceof every factor on this as follows:

$$\Delta_G = G_{cr._1} - G_{cr._0} = \left(\frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_0 - c_{v_0}}\right) * \frac{1}{q_{max.}} * 100 \quad (\%) \quad (19)$$

We re-write the relation and we have:

$$\Delta_{CA} = \left(\frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_0 - c_{v_0}} + \frac{CF_0}{p_1 - c_{v_0}} - \frac{CF_0}{p_1 - c_{v_0}} + \frac{CF_0}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_1}}\right) * \frac{1}{q_{max.}} * 100 \quad (20)$$

We re-arrange the terms and the relation becomes:

$$\Delta_{CA} = \left(\frac{CF_0}{p_1 - c_{v_0}} - \frac{CF_0}{p_0 - c_{v_0}}\right) * \frac{100}{q_{max.}} + \left(\frac{CF_0}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_0}}\right) * \frac{100}{q_{max.}} + \left(\frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_1}}\right) * \frac{100}{q_{max.}} \quad (21)$$

The total change of the breakeven point through the usage of the productive capacity is due to:

– change of prices:

$$\Delta_{p_G} = \left(\frac{CF_0}{p_1 - c_{v_0}} - \frac{CF_0}{p_0 - c_{v_0}}\right) * \frac{1}{q_{max.}} * 100 \quad (\%) \quad (22)$$

– change of variable cost per unit:

$$\Delta_{c_{v_G}} = \left(\frac{CF_0}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_0}}\right) * \frac{1}{q_{max.}} * 100 \quad (\%) \quad (23)$$

– change of the fixed costs:

$$\Delta_{CF_G} = \left(\frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_1}}\right) * \frac{1}{q_{max.}} * 100 \quad (\%) \quad (24)$$

D. The breakeven point change through the critical period

We do the same thing in order to find out the change of the breakeven point through the critical period and the influence of every factor on this as follows:

$$\Delta_t = t_{cr.1} - t_{cr.0} = \left(\frac{p_1 * CF_1}{p_1 - c_{v_1}} * \frac{1}{CA_1} - \frac{p_0 * CF_0}{p_0 - c_{v_0}} * \frac{1}{CA_0}\right) * T = \left[\frac{CF_1}{q_1 * (p_1 - c_{v_1})} - \frac{CF_0}{q_0 * (p_0 - c_{v_0})}\right] * T \quad \text{(days)} \quad (25)$$

We re-write the relation and we have:

$$\Delta_t = \left[\frac{CF_1}{q_1 * (p_1 - c_{v_1})} - \frac{CF_0}{q_0 * (p_0 - c_{v_0})} + \frac{CF_0}{q_0 * (p_1 - c_{v_0})} - \frac{CF_0}{q_0 * (p_1 - c_{v_0})} + \frac{CF_0}{q_0 * (p_1 - c_{v_1})} - \frac{CF_0}{q_0 * (p_1 - c_{v_1})} + \frac{CF_1}{q_0 * (p_1 - c_{v_1})} - \frac{CF_1}{q_0 * (p_1 - c_{v_1})}\right] * T \quad (26)$$

We re-arrange the terms and the relation becomes:

$$\Delta_t = \left[\frac{CF_0}{q_0 * (p_1 - c_{v_0})} - \frac{CF_0}{q_0 * (p_0 - c_{v_0})} + \frac{CF_0}{q_0 * (p_1 - c_{v_1})} - \frac{CF_0}{q_0 * (p_1 - c_{v_0})} + \frac{CF_1}{q_0 * (p_1 - c_{v_1})} - \frac{CF_0}{q_0 * (p_1 - c_{v_1})} + \frac{CF_1}{q_1 * (p_1 - c_{v_1})} - \frac{CF_1}{q_0 * (p_1 - c_{v_1})}\right] * T \quad (27)$$

So the total change of the numbers of the days from a period necessary for obtaining the breakeven point is due to:

– change of prices:

$$\Delta_{p_t} = \left[\frac{CF_0}{q_0*(p_1-c_{v_0})} - \frac{CF_0}{q_0*(p_0-c_{v_0})}\right] * T \quad \text{(days)} \tag{28}$$

– change of the variable cost per unit:

$$\Delta_{c_{v_t}} = \left[\frac{CF_0}{q_0*(p_1-c_{v_1})} - \frac{CF_0}{q_0*(p_1-c_{v_0})}\right] * T \quad \text{(days)} \tag{29}$$

– change of the fixed costs:

$$\Delta_{CF_t} = \left[\frac{CF_1}{q_0*(p_1-c_{v_1})} - \frac{CF_0}{q_0*(p_1-c_{v_1})}\right] * T \quad \text{(days)} \tag{30}$$

– change of the volume of the activity:

$$\Delta_{q_t} = \left[\frac{CF_1}{q_1*(p_1-c_{v_1})} - \frac{CF_1}{q_0*(p_1-c_{v_1})}\right] * T \quad \text{(days)} \tag{31}$$

Every change from those analysed is interpreted as follows:

- the change with + → unfavorable change;
- the change with – → favorable change.

4. Case study

In order to sustain the theoretical approach and in order to understang easier the utility of the breakeven point in analysing an entity, we present in table 1 the data of an entity with productive activity in two consecutive.

The entity will be considered after all the criteria listed.

Tabelul 1. The budget of earnings and expenses

Indicators	**Year 0**	**Year 1**
The unit selling price (lei/piece)	120	125
The unit variable cost (lei/piece)	64	62
The total fix costs (lei)	238.000	255.150
The productive and sold quantity (pieces)	6.250	6.100
The maximum productive capacity (pieces)	8.000	8.000

A. The change of the breakeven point through the physical volume of the activity

The breakeven point for year 0 and for year 1 would be:

$$q_{cr.0} = \frac{CF_0}{p_0 - c_{v_0}} = \frac{238.000\,\text{lei}}{(120-64)\text{lei/pc.}} = 4.250\ pc.$$

$$q_{cr.1} = \frac{CF_1}{p_1 - c_{v_1}} = \frac{255.150\,\text{lei}}{(125-62)\text{lei/pc.}} = 4.050\ pc.$$

The change of the breakeven point from year 1 to year 0 is –200 pieces as follows:

$$\Delta_q = q_{cr.1} - q_{cr.0} = 4.050\ pc. - 4.250\ pc. = -200\ pc.$$

Due to the lowering of the breakeven point in year 1 versus year 0, as a result the entity can sell 200 pieces less than in year 0 in order to reach the breakeven point. This is a favorable situation, because substracting the breakeven point, any soldover this breakeven point is a profit.

The total change of the breakeven point is duet o the following factors:

– the change of the prices:

$$\Delta_{p_q} = \frac{CF_0}{p_1 - c_{v_0}} - \frac{CF_0}{p_0 - c_{v_0}} = \frac{238.000\ lei}{(125-64)\text{lei/pc.}} - \frac{238.000\ lei}{(120-64)\text{lei}/pc.} = -348{,}36\ pc.$$

The change of the selling price in year 1 versus yaer 0, its increasing with 5 lei/pc. (from 120 lei/pc. to 125 lei/pc.) influences the breakeven point positively, through reducing of it in year 1 with 348 pieces versus year 0. This is duet o the greater profit on the sold product.

– the change of the variable unit cost:

$$\Delta_{c_{v_q}} = \frac{CF_0}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_0}} = \frac{238.000\ lei}{(125-62)\text{lei/pc.}} - \frac{238.000\ lei}{(125-64)\text{lei}/pc.} = -123{,}86\ pc.$$

(36)

The lowering of the variable cost/unit with2 lei/pc. (from 64 lei/pc. in year 0 to 62 lei/pc. in year 1) influences positively the breakeven point by lowering it with 124 pieces in year 1 versus year 0. Due to the lowering of the variabil cost/unit, the entity increases the profit sold products, so it needs to sell less in order to cover its expenses.

– the change of the fixed costs:

$$\Delta_{CF_q} = \frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_1}} = \frac{255.150\ lei}{(125-62)\text{lei/pc.}} - \frac{238.000\ lei}{(125-62)\text{lei}/pc.} = +272{,}22\ pc.$$

The increase of the fixed costs from 238.000 lei in year 0 at 255.515 lei in year 1 influences negatively the breakeven point, the entity should sell in year 1 more 272 pieces than in year 0 in order to reach the breakeven point. This happens duet o the costs increasing and to the lower profit obtained through the sold product.

B. The change of the breakeven point through the value volume of the activity

Analysing the breakeven point through the turnover we obtain:

$$CA_{cr.0} = \frac{p_0 * CF_0}{p_0 - c_{v_0}} = \frac{120\ lei * 238.000\ lei}{(120-64)lei/pc.} = 510.000\ lei$$

$$CA_{cr.1} = \frac{p_1 * CF_1}{p_1 - c_{v_1}} = \frac{125\ lei * 255.150\ lei}{(125-62)lei/pc.} = 506.250\ lei$$

The turnover change in year 1 versus year 0 is of – 3.750 lei as follows:

$$\Delta_{CA} = CA_{cr.1} - CA_{cr.0} = 506.250\ lei - 510.000\ lei = -3.750\ lei.$$

Because the breakeven point has lowered in year 1 versus year o, the entity can sell with 3.750 lei less in year 1 versus year 0 in order to reach the breakeven point. The greater are the sold by the minimum point of 506.250 lei, the greater is the profit of the entity.

The total change of the breakeven point is duet o the following factors:

$$\Delta_{p_{CA}} = \frac{p_1 * CF_0}{p_1 - c_{v_0}} - \frac{p_0 * CF_0}{p_0 - c_{v_0}} = \frac{125\ lei * 238.000\ lei}{(125-64) lei/pc.} - \frac{120\ lei * 238.000\ lei}{(120-64) lei/pc.} = -22.295\ lei$$

The change of the selling price influences positively the breakeven point through the lowering of it with 22.295 lei, the increase of the price product determines a lower of the selling price in order to cover the costs.

– the change of the variable unit cost:

$$\Delta_{c_{v_{CA}}} = \frac{p_1 * CF_0}{p_1 - c_{v_1}} - \frac{p_1 * CF_0}{p_1 - c_{v_0}} = \frac{125\ lei * 238.000\ lei}{(125-62) lei/pc.} - \frac{125\ lei * 238.000\ lei}{(125-64) lei/pc.} = -15.483\ lei$$

The lowering of the variabil unit cost determined an increase of the profit of the product, having as a result a lowering of the breakeven point with 15.483 lei.

– the change of the fixed costs:

$$\Delta_{CF_{CA}} = \frac{p_1 * CF_1}{p_1 - c_{v_1}} - \frac{p_1 * CF_0}{p_1 - c_{v_1}} = \frac{125\ lei * 255.150\ lei}{(125-62) lei/pc.} - \frac{125\ lei * 238.000\ lei}{(125-62) lei/pc.} = +34.028\ lei$$

The increase of the fixed costs has as a result an increase of the breakevenpoint, so that in year 1 the entity should sell with 34.028 lei more than in year 0 in order to reach to the breakeven point. The increase of the fixed costs has a negative influence on the breakeven point, and this increase implies greater sellings; for example making a decision regarding aids costs should take into account how much should increase the sellings and if these costs will determine an increase of the entity's profit.

C. The change of the breakeven point through the usage degree of the productive capacity

Analysisng the breakeven point through the usage degree of the productive capacity, we have:

$$G_{cr._0} = \left(\frac{CF_0}{p_0 - c_{v_0}}\right) * \frac{1}{q_{max.}} * 100 = \frac{238.000\ lei}{(120-64) \text{lei}/pc.} * \frac{1}{8.000\ pc.} * 100 = 53{,}125\%$$

$$G_{cr._1} = \left(\frac{CF_1}{p_1 - c_{v_1}}\right) * \frac{1}{q_{max.}} * 100 = \frac{255.150\ lei}{(125-62) \text{lei/pc.}} * \frac{1}{8.000\ pc.} * 100 = 50{,}625\%$$

The usage degree of the productive capacity decreases in year 1 versus year 0 for reaching the breakeven point, and this is a favourable change, the entity being able to increase through the usage of the released productive capacity of 2,5 % as follows:

$$\Delta_G = G_{cr._1} - G_{cr._0} = 50{,}625\% - 53{,}125\% = -2{,}5\%$$

The total change of the breakeven point through the usage degree of the productive capacity is due to:

– the change of the prices:

$$\Delta_{p_G} = \left(\frac{CF_0}{p_1 - c_{v_0}} - \frac{CF_0}{p_0 - c_{v_0}}\right) * \frac{1}{q_{max.}} * 100 = \left(\frac{238.000\ lei}{(125-64)\text{lei/pc.}} - \frac{238.000\ lei}{(120-64)\text{lei}/pc.}\right) * \frac{100}{8.000\ pc.} = -4{,}35\%$$

As one can see, the increase of the selling price has as a result the lowering of the breakeven point from the usage point of view of the productive capacity with 4,35% (year 1 compared year 0), that ist o say that the increase of the price of the product allows the quicker recovery of the costs, allowing to this difference of 4,35% to turn into profit.

– the change of the variable unit cost:

$$\Delta_{c_{v_G}} = \left(\frac{CF_0}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_0}}\right) * \frac{1}{q_{max.}} * 100 = \left(\frac{238.000\ lei}{(125-62)\text{lei/pc.}} - \frac{238.000\ lei}{(125-64)\text{lei}/pc.}\right) * \frac{100}{8.000\ pc.} = -1{,}55\%$$

The decrease of the variabil cost unit has as a result a favourable usage degree of the productive capacity for reaching of the minimum cost, this lowering with 1,55% in year 1 versus year 0. It means that, the lowering of the variabil cost unit releases a productive capacity of 1,55% for reaching the breakeven point which usage turns into profit

– the change of the fixed costs:

$$\Delta_{CF_G} = \left(\frac{CF_1}{p_1 - c_{v_1}} - \frac{CF_0}{p_1 - c_{v_1}}\right) * \frac{1}{q_{max.}} * 100 = \left(\frac{255.150\ lei}{(125-62)\text{lei/pc.}} - \frac{238.000\ lei}{(125-62)\text{lei}/pc.}\right) * \frac{100}{8.000\ pc.} = +3{,}4\%$$

The increase of the fixed costs has a negative influence on the usage degree of the productive capacity necessary for reaching the breakeven point. The entity should use the productive capacity with 3,4 % more in year 1 versus year 0 in order to reach the breakeven point. Totally, the negative influence of the increase of the fixed costs is canceled by the positive influence of the increase of unit price, of the lowering for the variabil cost unit, the total change of the breakeven point from the point of view of the usage degree of the productive capacity, being favourable for the entity.

D. The breakeven point change through the critical period

Analysing the breakeven point from the critical period point of view we have:

$$t_{cr.0} = \frac{CF_0}{q_0 * (p_0 - c_{v_0})} * T = \frac{238.000\ lei}{6.250\ pc. * (120-64)\text{lei}/pc.} * 365\ days = 248{,}2\ days$$

$$t_{cr.1} = \frac{CF_1}{q_1 * (p_1 - c_{v_1})} * T = \frac{255.150\ lei}{6.100\ pc. * (125-62)\text{lei}/pc.} * 365\ days = 242{,}34\ days$$

As one can see, the critical period lowers with 6 days in year 1 versus year 0. It means that in year 1 the entity reaches 6 days earlier the breakeven point in year 1 than in year 0. In year 0 the entity's profit starts from the 248 days and in year 1 it happens starting from 242 days of the year. This has a result a favourable scale of the profit, because the entity covers the costs quicker, the rest of the period being as a profit.

$$\Delta_t = t_{cr.1} - t_{cr.0} = 242{,}34\ days - 248{,}2\ days = -5{,}86\ days$$

The total change of the number of days (year 1 versus year 0) necessary for reaching the breakeven point is due to:

– the changes of the prices:

$$\Delta_{p_t} = \left[\frac{CF_0}{q_0*(p_1-c_{v_0})} - \frac{CF_0}{q_0*(p_0-c_{v_0})}\right] * T = [\frac{238.000\ lei}{6.250\ pc.*(125-64)\text{lei/pc.}} - \frac{238.000\ lei}{6.250\ pc.*(120-64)\text{lei}/pc.}] * 365\ days$$

$$\Delta_{p_t} = -20{,}35\ days$$

The change of the selling price has determined a decreasing of the critical period with 20 days, and that means: the entity covers its costs with 20 days earlier in year 1 versus year 0. The change of the breakeven point through its decrease is a favourable event, the entity having in year 1 more time in order to obtain some profit (the period of the year left).

– the change of the variable unit cost:

$$\Delta_{c_{v_t}} = \left[\frac{CF_0}{q_0*(p_1-c_{v_1})} - \frac{CF_0}{q_0*(p_1-c_{v_0})}\right] * T = [\frac{238.000\ lei}{6.250\ pc.*(125-62)\text{lei/pc.}} - \frac{238.000\ lei}{6.250\ pc.*(125-64)\text{lei}/pc.}] * 365\ days$$

$$\Delta_{c_{v_t}} = -7{,}23\ days$$

The decrease of the variabil cost unit has a result the decrease of the critical period with 7 days, inferior to the influence of the product's price increasing but favourable to the entity.

– the change of the fixed costs:

$$\Delta_{CF_t} = \left[\frac{CF_1}{q_0*(p_1-c_{v_1})} - \frac{CF_0}{q_0*(p_1-c_{v_1})}\right] * T = \left[\frac{255.150\ lei}{6.250\ pc.*(125-62)\text{lei/pc.}} - \frac{238.000\ lei}{6.250\ pc.*(125-62)\text{lei}/pc.}\right] * 365\ days$$

$$\Delta_{CF_t} = +15{,}9\ days$$

The increasing of the fix costs determines the increasing of the critical period with 16 days (in year 1 versus year 0), that means the entity should produce a longer period of the year in order toc over its costs. The unfavourable influence of the fixed costs is undetermined by the favourable influence of the price product increase, having as a result the decrease of the variabil cost unit. The favourable influence is superior to the unfavourable one.

– the change of the volume of the activity:

$$\Delta_{q_t} = \left[\frac{CF_1}{q_1*(p_1-c_{v_1})} - \frac{CF_1}{q_0*(p_1-c_{v_1})}\right] * T = [\frac{255.150\ lei}{6.100\ pc.*(125-62)\text{lei/pc.}} - \frac{255.150\ lei}{6.250\ pc.*(125-62)\text{lei}/pc.}] * 365\ days$$

$$\Delta_{q_t} = +5{,}82\ days$$

The decrease of the volume of the activity (from 6.250 pieces in year 0 to 6.100 pieces in year 1) has a negative influence over the critical period, having an increase with 6 days in year 1 versus year 0, which could be interpreted as an unfavourable decrease of the activity over the breakeven point.

The analysis of the changes of the breakeven point under the influence of the researched factors is shown in table 2.

Table 2. The analysis of the changes of the breakeven point (year 1 versus year 0)

	Deviation	
Indicators	**Favourable**	**Unfavourable**
The change through the physical volume of the activity: Δ_q	**−200 pieces**	

- due to the change of the prices: Δ_{p_q}	−348,36 pieces	
- due to the change of variable unit cost: $\Delta_{c_{v_q}}$	−123,86 pieces	
- due to the change of the fixed costs: Δ_{CF_q}		+272,22 pieces
The change through the value volume of the activity: Δ_{CA}	**−3.750 lei**	
- due to the change of the prices: $\Delta_{p_{CA}}$	−22.295 lei	
- due to the change of variable unit cost: $\Delta_{c_{v_{CA}}}$	−15.483 lei	
- due to the change of the fixed costs: $\Delta_{CF_{CA}}$		+34.028 lei
The change through the usage degree of the productive capacity: Δ_G	**−2,5%**	
- due to the change of the prices : Δ_{p_G}	−4,35%	
- due to the change of variable unit cost: $\Delta_{c_{v_G}}$	−1,55%	
- due to the change of the fixed costs: Δ_{CF_G}		+3,4%
The change through the critical period: Δ_t	**−5,86 days**	
- due to the change of the prices : Δ_{p_t}	−20,35 days	
- due to the change of variable unit cost: $\Delta_{c_{v_t}}$	−7,23 days	
- due to the change of the fixed costs: Δ_{CF_t}		+15,9 days
- due to the change of the volume activity: Δ_{q_t}		+5,82 days

5. Conclusions

The breakeven point represent an important analysis instrument for measuring the effect produced by the selling price, by the variabil cost unit, and by the fixed costs which should be reached before the entity to obtain the exploiting profit. This analysis allows knowing the influence of every factor in entity's profitability, allowing to the managers right decision making, based on the important influence of the analysis factors in the results obtained by the entity.

References

Burja, C., 2008, Financial consequences of the sales variation, Proceedings International Conference on Applied Economics Kastoria Greece (May 2008), pp. 105-110;
Buşe, L., 2005, Analiză economico-financiară, Ed. Economică, Bucureşti, pp. 301-310;
Mihai, I., 1999, Analiză economico-financiară, Ed. Mitron, Timişoara;
Păvăloaie, W. şi colab., 2010, Analiza economico-financiară. Concepte şi studii de caz, Ed. Economică, Bucureşti, pp. 353-370;
Petcu, M., 2009, Analiza economico-financiară a întreprinderii, Ed. Economică, Bucureşti, pp. 225-234;
Stancu, I., 2006, Măsurarea performanţei întreprinderii, Economie teoretică şi aplicată, Nr. 1/2006 (496), pp. 8-12;
Vâlceanu, G.; Robu, V.; Georgescu, N., 2005, Analiză economico-financiară, Ed. Economică, Bucureşti, pp. 287-292.